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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,085	03/25/2004	Feng Liang	FGT 3G4 (81099482)	9750
36865	7590	05/13/2005	EXAMINER	
ALLEMAN HALL MCCOY RUSSELL & TUTTLE, LLP			RIDDLE, KYLE M	
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PORTLAND, OR 97205			ART UNIT	PAPER NUMBER
			3748	

DATE MAILED: 05/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/811,085

Applicant(s)

LIANG ET AL.

Examiner

Kyle M. Riddle

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10-14 and 16-25 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 22 and 23 is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-14, 16-21, 24 and 25 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 May 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Response to Amendment

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Controller 12 cited on page 8, lines 5-6, 19, 29, page 9, lines 3, 4, 9, 27, and page 10, line 2 is not designated in the drawings. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Although the drawings consisting of six pages submitted with the original application on 25 March 2004 have the controller 12 labeled, the substitute drawings consisting of five pages submitted on 3 May 2004 do not. Since these drawings replace the previously submitted version, correction to these drawings is required.

2. Figure 3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR

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1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Applicant asserts on page 8 of the amendment, top of the page, that a replacement sheet labeling Figure 3 as "Prior Art" was included with the proposed amendment. Examiner could find no such replacement sheet.

Comment

3. Regarding claim 1 in applicant's amendment received 10 February 2005, the amended claim 1 now appears to have two preambles -- "A system comprising:" and "A valve actuator coupled to a valve of an internal combustion engine, comprising:". Currently amended claim 1 is supposed to be amending claim 1 of the preliminary amendment received 19 August 2004. Claim 1 of the preliminary amendment does not start with "A system comprising:" and the currently amended claim 1 does not correctly identify this beginning as an addition to the previous claim by underlining. Examiner requests that the applicant clearly identify the added claim limitations and ambiguous wording of the preamble.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 3, 5-8, 10-14, 21, 24, and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Inoue et al. (U.S. Patent 4,152,570).

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Re claims 1, 3, 5, 10, 21, and 24, Inoue et al. disclose a drive assembly comprising:

- a plurality of electromagnets 11A-11D with coils and having a core or conical member 10 (column 3, lines 14-21);
- an armature or disk plate 8 attached to a shaft 5 axially movable through the core or conical member 10, the axis of the coil windings being parallel to the movement of the disk plate 8 (column 2, lines 64-68 and Figure 1);
- the conical member 10 having a permanent magnet piece 7 angled relative to the axial movement of the shaft with ends extending below the coils and toward the plate 8 with an inner part of the magnet 7 being closer to a center of the core or conical member 10 than an outer part of the magnet 7 (column 2, lines 58-63 and Figure 1);
- the permanent magnet piece 7 contained within the interior portion of the coils (Figure 1);
- the combination of the electromagnets permanent magnet piece 7 increasing the magnetic properties of the device to insure multi-directional uniformity and desired displacement of the shaft (column 1, lines 36-47).

Re claims 6-8, 11, 14, and 25, Inoue et al. disclose an air or magnetic gap G adjacent the curved or conical shaped permanent magnet piece 7, the core 10 separating the coil and gap G (column 3, lines 12-15, lines 57-65, and Figure 1).

Re claim 12, Inoue et al. disclose the angle of the permanent magnet piece 7 being between 5 and 85 degrees (Figure 1).

Re claim 13, Inoue et al. disclose the permanent magnet piece 7 extending fully along a height of the coils (Figure 1).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-3, 5, 11, 12, 14, 17, 18, 20, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guerin et al. (EP 1174595 A1) in view of Inoue et al.

Re claims 1, 3, 5, 11, 14, 17, 18, 20, and 24, Guerin et al. disclose a valve actuator comprising:

- a pair of electromagnets 60, 61 with coils or reels 63, 64 and core or polar parts 65, 66, 67, 68 (see translation, paragraphs 79-81 and Figure 3);

- permanent magnets 69, 70 inclined at an angle to the shaft or valve stem 76 and surrounded by the coils or reels 63, 64 (paragraph 81 and Figure 3);

- an armature or pallet 75 fixed to the valve stem 76 extending through the core or polar parts 65, 66, 67, 68 and axially movable to actuate an engine valve 77 of an internal combustion engine (paragraph 84 and Figure 3);

- the use of the angled permanent magnets 69, 70 with the electromagnets 60, 61 increasing the magnetic properties of the actuator and reducing losses (paragraphs 87-93).

Re claim 2, Guerin et al. disclose rectangular shaped permanent magnets 69, 70 (Figure 3).

Re claim 12, Guerin et al. disclose the permanent magnets 69, 70 being inclined between 5 and 85 degrees (Figure 3).

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Guerin et al. fail to disclose an axis of the coils being parallel to the armature movement or an air gap adjacent to the permanent magnet.

Inoue et al. teach a drive assembly comprising an armature or disk plate 8 attached to a shaft 5 axially movable through the core or conical member 10, the axis of the coil windings being parallel to the movement of the disk plate 8 (column 2, lines 64-68 and Figure 1), and an air or magnetic gap G adjacent the curved or conical shaped permanent magnet piece 7, the core 10 separating the coil and gap G (column 3, lines 12-15, lines 57-65, and Figure 1). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Inoue et al. in the valve actuator of Guerin et al., since the use thereof would have provided a more specific arrangement of the magnetic coils and valve actuating properties for more efficient valve actuation.

8. Claims 4 and 16 are rejected under 35 U.S.C. 103(a) as being obvious over Inoue et al.

Inoue et al. disclose devices with electromagnets, coils, a shaft with an armature, and permanent magnets inclined at an angle to the shaft. They, however, fail to disclose a particular cross-sectional shape or layering of the permanent magnets. The V-shaped cross-sectional design of the permanent magnets or the inclusion of multiple layers of magnetic material in creating the permanent magnets would have been obvious to one having ordinary skill in the art depending on space requirements, flux densities, and manufacturing considerations. Moreover, there is nothing in the record which establishes that the application of such a cross-section or layering represents a novel or unexpected result (See *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975)).

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9. Claim 19 is rejected under 35 U.S.C. 103(a) as being obvious over Guerin et al. in view of Inoue et al.

Guerin et al., as modified by Inoue et al., disclose the valve actuator cited above, however, fail to disclose other valves of the engine being cam actuated. It is well known in the art to actuate intake or exhaust valves by means of camshafts and cams. Guerin et al. discloses a valve actuator to actuate any engine cylinder valve 77 (paragraph 84). The addition of actuating the intake valves only with the actuator of Guerin et al. and cam actuating the exhaust valves would have been obvious to one having ordinary skill in the art depending on timing and lift characteristics, space constraints, performance results, etc. Moreover, there is nothing in the record which establishes that the combination of cam actuated and electromagnetically actuated valves represents a novel or unexpected result (See *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975)).

Allowable Subject Matter

10. Claims 22 and 23 are allowed.

Response to Arguments

11. Applicant's arguments filed 10 February 2005 have been fully considered but they are not persuasive.

12. Applicant argues in the last paragraph on page 8 that the device of Inoue et al. would provide degraded ability if applied to valve actuation in an internal combustion engine. Inoue et al., as cited above for the specified claims, provides the same structural limitations as the applicant claims, the drive assembly serving substantially the same function of a valve driving mechanism. Furthermore, applicant incorrectly argues on the top of page 9 that Inoue et al.

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formed the sole basis of rejecting claims 11, 17, and 21. Claims 11 and 17 were also rejected under 35 U.S.C. 102(b) as being anticipated by Guerin et al. Applicant fails to address the amending of claims 11 and 17 to include an air gap and the advantages thereof over the prior cited art. Examiner has combined the teachings of Inoue et al. in the valve actuator of Guerin et al. to renew the rejection to these newly amended claims. Applicant's arguments on page 9 pertaining to the axis of the coil windings versus the movement of the armature with regard to the Guerin et al. reference are persuasive, however, the combination of the above two references make obvious the newly amended limitations.

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Communication

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kyle M. Riddle whose telephone number is (571) 272-4864. The examiner can normally be reached on M-F (07:30-5:00) Second Friday Off.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Denion can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kyle M. Riddle
Examiner
Art Unit 3748

kmr



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